PROMOTING ECOLOGICAL SUSTAINABILITY THROUGH GAMIFICATION: NAVIGATING RISKS AND CHALLENGES IN ENTREPRENEURIAL START-UPS

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ABSTRACT
In the modern business environment, ecological sustainability has transitioned to becoming a priority. Gamification has emerged as a promising technique for fostering both commercial and ecological sustainability, particularly for start-ups that have limited resources. This research investigates the significance of gamification in the context of entrepreneurial start-ups, examining the potential obstacles, risk factors, and mistakes that may hinder its effective and enduring integration. The utilization of gamification is becoming more widely recognized as a strategy to augment employee efficiency and foster consumer involvement. Additionally, it serves as a method to stimulate sustainable practices, including energy preservation, waste minimization, and the promotion of environmentally friendly projects. The twin advantage of gamification has particular appeal for start-up enterprises. However, potential misalignments with the organization's business plan, cultural disparities, limited technological support, and employee disengagement have the potential to undermine the achievement of both commercial growth objectives and ecological goals. This study does a comprehensive investigation to identify errors that occur in the design and execution of gamified systems. For example, an inadequately constructed incentive structure may unintentionally promote behaviors that result in wastefulness, whilst disregarding feedback could contribute to the adoption of unsustainable practices. Furthermore, the failure to prioritize individual variances may lead to overlooking potential advantages in utilizing one's particular ecological values. It is imperative for start-up enterprises that aspire to match their growth trajectory with ecological sustainability to possess a comprehensive awareness of these potential challenges. This study seeks to provide insights into the issues faced by start-ups in designing and implementing gamified systems that align with both commercial growth objectives and ecological sustainability goals.

Keywords: Entrepreneurship, Gamification, Risks, Sustainability-based business models

1. INTRODUCTION

Within the domain of business, start-ups embody a dynamic ecosystem characterized by innovation and adaptability. Startups are fundamentally distinct from well-established firms, frequently distinguished by their constrained resources, accelerated expansion, and a pronounced requirement for distinction. The start-up ecosystem shown remarkable resilience and exhibited substantial growth, effectively recovering from the adversities posed by the global epidemic. Based on the findings of the Global Start-up Ecosystem Report (GSER), it was seen that the global start-up economy attained a valuation of over $3.8 trillion. The United States maintained its position as a prominent participant, hosting almost 50% of the global population of unicorns. Nevertheless, the emergence of additional entrepreneurial centers such as Beijing, Bangalore, and London signifies a broader worldwide dispersion of entrepreneurial endeavors. Furthermore, there was a notable increase in the number of gig workers and freelancers within the technology industry. A publication in the Harvard Business Review (2021) emphasized that around 43% of the United States labor force will be engaged in the gig economy by the year 2024.

The implementation of gamification, a novel approach, has garnered considerable interest among entrepreneurs in the start-up ecosystem. Fundamentally, gamification entails the incorporation of game design components within situations that are not inherently games, with the aim of augmenting user involvement, interaction, and allegiance. The approach described surpasses mere engagement in games, as it integrates the mechanics and dynamics of gaming into routine activities, so converting ordinary work into incentivizing and stimulating experiences (Huotari & Hamari, 2022). According to Deterding et al. (2011), gamification is characterized as the incorporation of game design components into situations that are not inherently related to gaming. This definition emphasizes the ability of gamification to use the innate human inclination towards competition, accomplishment, and receiving feedback. By utilizing these ideas, start-up companies can effectively interact with their consumers or workers, hence improving user experience and cultivating loyalty. These emerging enterprises frequently endeavor to distinguish themselves in highly competitive industries, and the incorporation of gamified components presents a novel strategy for enhancing both internal processes and consumer interaction. However, the unique characteristics of this phenomenon also provide a series of problems when it comes to its application in enterprises of different sizes and industries. Existing research indicates that gamification faces inherent obstacles and challenges, particularly in start-up contexts where the margin for error is narrow and each decision carries significant consequences. The customary use of gamification has generally focused on motivating employees by replacing traditional financial incentives. However, its potential to foster ecological sustainability in start-ups has not been fully explored. The pursuit of ecological sustainability is of utmost importance for the future of our world. In this regard, start-up companies, known for their agility and adaptability, have the potential to take the lead. The utilization of gamification can be a powerful instrument in this pursuit, since it has the potential to enhance productivity and cultivate a sustainable culture.

Due to the popularity of the term, during the last decade, companies actively accept gamification as a new method for motivating employees, while in certain cases, key aspects are not taken into account during its implementation. It leads to failure during the implementation, and certain barriers appear before and during the implementation itself. A study by TalentLMS found that only 53% of employees find gamified training programs interesting, while 63% believe traditional training methods are more effective. A Badgeville study found that 70% of business transformation efforts fail, and gamification can help address some of the key reasons for this failure, such as a lack of engagement and participation and poor alignment with business goals. According to a TalentLMS survey, 78% of respondents said gamification in the

workplace would make them more productive, while 89% believed it would make them more engaged and motivated. However, only 14% of respondents said their company currently uses gamification. A Deloitte study found that while 87% of surveyed companies rated engagement as a top priority, only 25% of them had some sort of formal strategy to address it. Gamification was identified as a potential solution to increase employee engagement and motivation. These statistics have led to a new approach to gamification, with the aim of identifying potential risks and barriers and overcoming them.

## 2. MAIN CHALLENGES OF GAMIFICATION

The general barriers that companies face include:

- **Incoherence with the strategy and goals** – There is a lack of coherence between the approach and goals. Start-up enterprises, characterized by their frequently dynamic and adaptable business structures, particularly those focused on ecological sustainability, necessitate gamification techniques that align harmoniously with their overarching objective. According to Kapoor (2015), the implementation of gamification strategies has the potential to enhance staff engagement by emphasizing internal motivators. However, it is imperative for start-up companies to ensure that these motivators are in line with their broader objectives of fostering ecological sustainability.

- **Irrelevance with organizational culture** - Start-up companies inherently exhibit a distinct organizational culture in comparison to well-established organizations. Incorporating gamification into these start-ups should not only align with their unique culture but also encourage sustainable behaviors and practices, hence enhancing the organization's fundamental ecological principles (Schein, 2010).

- **Weak technical support** – Given the substantial dependence of gamification on information and communication technologies (ICT), it is worth noting that start-ups, especially those operating within the ecological domain, may have challenges due to their limited access to sophisticated IT infrastructure, which larger firms typically possess. Engaging external IT support could perhaps be a feasible alternative, albeit it is vital to ascertain that this support possesses a comprehensive understanding of the distinctive requirements associated with sustainability-driven endeavors. The significance of gamification's technical intricacies is underscored in the studies conducted by Werbach and Hunter (2012) as well as Hamari et al. (2014). This importance is particularly pronounced in the context of eco-start-ups.

- **Need for training and support** – In the context of start-up ventures, particularly those operating with limited personnel, the provision of training assumes a critical role. The use of gamification strategies with the objective of fostering ecological sustainability necessitates a requisite understanding and consciousness of environmental concerns. It is of utmost importance to ensure that all individuals involved with the gamified system, including team members and customers, possess a comprehensive understanding and genuine appreciation for its sustainable intricacies.

- **Limited resources** – The availability of resources is constrained. Start-up companies, inherently, function within limited resources. Although gamification may appear to be a cost-effective method of motivation, start-ups that are focused on addressing ecological concerns may require specific resources for its implementation. These resources could include eco-knowledge, specialized technical tools, or partnerships with eco-organizations. In their study, Mora et al. (2016) emphasized the financial difficulties that are particularly exacerbated for newly established businesses. The task at hand involves not only the initial implementation, but also the ongoing maintenance of a gamified system that keeps consistently updated with the most recent developments in the field of ecology.

- **Risk of superficial engagement on Sustainability Issues** – Gamification strategies frequently place significant focus on competitive elements such as leaderboards and point systems. However, in the context of ecological sustainability, collaborative endeavors tend to yield greater advantages. The prioritization of a competitive atmosphere may occasionally detract from the overarching objectives of sustainable projects. Collaborative endeavors, such as the group engagement in problem-solving, have demonstrated enhanced efficacy in tackling environmental concerns. Nevertheless, it is frequently observed that gamification systems tend to place greater emphasis on individual accomplishments rather than the advancement of the collective. The study conducted by Brundiers and Wiek (2013) examined the role of collaboration in the context of sustainability education, revealing that collective approaches frequently result in more effective resolutions for sustainability-related issues.

- **Overemphasis on Competition vs. Collaboration -** One potential drawback of gamification is the possibility of promoting a superficial understanding of sustainability concerns by oversimplifying them in order to enhance user engagement. When addressing nuanced subjects such as ecological sustainability, there exists a potential danger of oversimplifying the intricacies and subtleties involved. This phenomenon may result in consumers participating in a shallow manner, so failing to acquire a profound comprehension or dedication to the fundamental sustainability issues. For instance, an individual may have a sense of achievement upon successfully planting a virtual tree within a gaming environment, although their level of motivation to engage in sustainable practices in the physical world may not be commensurate. In their 2015 study on the Anthropocene, Steffen et al. emphasize the complex interdependencies of ecological concerns. They argue that instructional and motivational strategies, such as gamification, should be cautious in avoiding excessive simplification.

2.1 Case study: Ecologi's Approach in Gamifying sustainability

In recent times, there has been a significant integration of technology and behavioral change through the utilization of mobile applications. Research from Torres-Toukoumidis et al., (2022) focused on ten primary mobile applications focused on ecology, finding that half of these apps aim to protect the environment by promoting eco-friendly habits and providing updated environmental information. Meanwhile, 20% of the apps emphasize educational strategies, training users on various projects from soil conservation to biodiversity preservation and community engagement in ecological issues. Figure 1 showcases these applications centered on ecology.
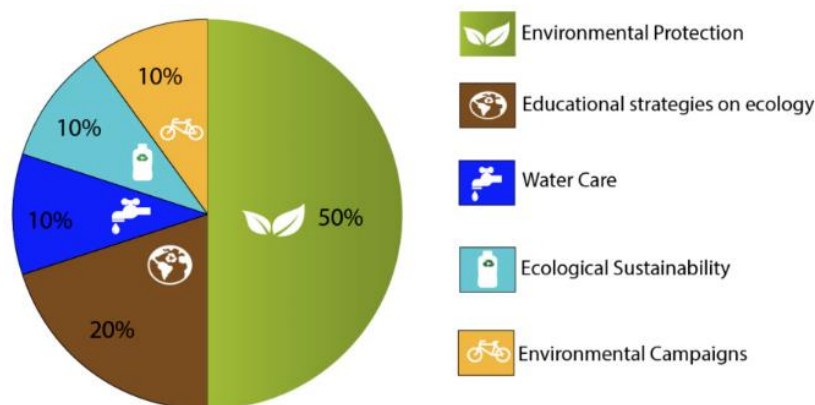
Graph 1. Mobile applications aimed at Ecology
(Source: Torres-Toukoumidis et al., 2022)

One notable illustration is the application "Ecologi," which effectively integrates gaming techniques with endeavors towards sustainability. Ecologi distinguishes itself as more than a mere application, as it serves as a comprehensive platform strategically developed to foster active participation in ecological and sustainability initiatives among its user base. The company Ecologi has successfully utilized gamification strategies, leading to the successful planting of more than 200 million trees[1], establishing collaborations with over 20 global projects, engaging with more than 500 enterprises, and attaining an impressive user retention rate of 80%.The mechanisms used in the application to promote sustainability include:

- **Tree Planting:** For many, the act of planting trees remains a distant, abstract activity. Ecologi transforms this by offering a virtual tree planting experience. Every contribution made by a user translates into a real tree being planted, which they can then visualize within the app.
- **Climate Projects:** Ecologi partners with various global climate projects, offering users the chance to support efforts like wind energy production or rainforest protection. Within the app, users can learn about these projects, understand their impact, and contribute accordingly.
- **Monthly Subscriptions:** To ensure consistent engagement, the app introduces a subscription model, enabling users to make monthly contributions towards sustainability actions, all while tracking their cumulative impact over time.
- **Interactive Dashboard:** The application's dashboard is a hub of information, showing the user's total contributions, the equivalent number of trees planted, and the CO_2 emissions reduced.

The specific use of gamification by this start-up to promote ecological sustainability include:

- **Visual Progress:** One of gamification's key tenets is showing progress. As users contribute and support more projects, they visually see their 'forest' grow within the app, a tangible representation of their contributions to the environment.
- **Badges and Milestones:** As with many gamified systems, Ecologi rewards users with badges for reaching specific milestones. This could range from planting their first 10 trees to supporting a particular climate project.
- **Leaderboards:** Introducing a slight competitive edge, the app showcases leaderboards. Users or businesses can see how their contributions rank against others, fostering a sense of community and shared purpose.
- **Learning and Discovery:** The app introduces elements of discovery, wherein users can learn more about various ecological projects, deepening their knowledge and understanding of sustainability.

3. RISKS IN GAMIFICATION IMPLEMENTATION

The implementation of gamification, particularly within the context of start-ups, presents a distinct array of obstacles. Start-up companies, renowned for their nimbleness and frequently constrained resources, must exercise careful discretion while formulating their plans. When these methods incorporate sustainability objectives, the associated risks can become more pronounced. The implementation of gamification strategies in start-up enterprises with the objective of achieving sustainability encompasses two broad domains:

- **Design phase of a gamified system** - The design phase of a gamified system is a pivotal stage, particularly for nascent enterprises. Due to the limitations imposed by their available resources, it is imperative for them to ensure the accuracy and effectiveness of their design on the initial attempt. Start-ups may incur higher costs as a result of errors

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[1] https://ecologi.com/articles/blog/gamification-the-key-to-sustainability-engagement-and-behaviour-change

made during the design process, in comparison to established enterprises. In addition, it is imperative that the design of the project aligns with the sustainability objectives of the start-up, so guaranteeing that the incorporation of gamified features effectively encourages environmentally conscious behaviors and choices. A system that is inadequately designed may not only lack the potential to effectively engage users, but it may also unintentionally encourage behaviors that are inconsistent with the principles of sustainability.

- **Implementation phase of a gamified system** - The implementation phase of a gamified system is often characterized by lean operating models commonly found in start-up organizations. The integration of gamified systems poses a potential risk of overwhelming the pre-existing infrastructure, encompassing both technological and cultural aspects. Achieving a seamless implementation, engaging the target audience, and effectively conveying the significance of sustainability may be a delicate balancing act. Furthermore, in the case of start-ups that prioritize environmental sustainability, the integration of gamified systems should ideally possess minimal carbon emissions, hence introducing an additional level of intricacy.

These endeavors are characterized by the simultaneous objectives of captivating users through the implementation of gamification techniques, as well as cultivating a sincere comprehension and dedication to the principles of sustainability. Moreover, considering that gamification extensively relies on principles from psychology, the inappropriate use of this approach can result in unforeseen outcomes. Instead of cultivating a culture that promotes creativity and ecological consciousness, errors in judgment might result in diminished levels of motivation and production. Existing literature offers valuable insights into the basic faults that frequently occur during the implementation of gamification, particularly when it is customized to suit the distinct ecology of sustainable start-ups.

3.1 Mistakes in the design phase

Several significant mistakes can be observed when designing a gamified system. These errors refer to the planning phase of the system, and can be crucial in its failure. Errors that appear when designing the system can be:

- **Insufficiently defined and clear goals** - one of the most common gamification design mistakes is the failure to identify system goals. This can cause confusion among the participants in the system, as well as among its designers. For start-ups focusing on sustainability, merely having a gamification goal isn't enough. The gamification objectives should be closely aligned with the start-up's core sustainability objectives, ensuring that every game element promotes eco-conscious behaviors (Hamari et al., 2014).
- **Focus on extrinsic motivators and rewards** - a gamification system that is too focused on material rewards such as badges or points can cause users to feel like they are playing the game only for rewards. This negates the main goal of gamification, which is the creation of satisfaction for the participant during the very implementation of the activities of a gamified system, and not the goal he achieves or the reward he would receive. It is essential to strike a balance between extrinsic rewards and intrinsic motivation in participants, such as enjoyment of playing a game or satisfaction in overcoming a problem (Ryan & Deci, 2000), like the satisfaction derived from making a sustainable choice.
- **Ignoring individual differences** - a gamification system that ignores individual characteristics of potential participants, is unlikely to be as effective for all users. It is crucial to build the system with different types of users in mind and to provide opportunities for customization (Reeve, 2009).

- **Feedback** - Feedback is very important in gamification systems, as it gives users a sense of progress and success. Lack of feedback can make the game ineffective or unattractive. It is necessary to provide users with frequent and useful feedback during each interaction with the system (Kapp, 2012)
- **Creating a complicated system** - a gamification system that is too complicated or difficult to understand can result in user dissatisfaction and abandonment. It is necessary to maintain the simplicity and intuitiveness of the system, while presenting enough challenge to motivate users to engage in constant interaction. (Werbach & Hunter, 2012), especially with the introduction of eco-related challenges.
- **Lack of social interaction** - social interaction is a key component of many successful gamification systems. A system that does not facilitate social interaction may not be as attractive to its users. It is necessary to provide the means for players to connect and participate in the game (Hamari et al., 2014). Gamification in sustainability-focused start-ups should encourage community actions. Without social interaction, users might miss out on collective eco-friendly endeavors.
- **Uniform approach** - when designing a gamification system, it is necessary to consider the context in which it will be used. A system that is effective in one situation may not be in another, even when it comes to two organizations of the same size, organizational structure, and industry. It is necessary to examine the individual desires and goals of the users in the context of the intended use of the game.
- **Lack of relevance** - a gamification system that is not related to the user's interests or aspirations may not be as attractive. It is essential to build the system with a user focus and deliver meaningful challenges and rewards. (Ryan & Deci, 2000). A badge for planting a tree might be attractive to some but not to those more interested in ocean conservation. Rewards and challenges should resonate with the user's environmental interests
- **Too much focus on competition** - competition can be a motivator for certain users, but on the other hand it can also create aversion and dissatisfaction to some extent. A gamification system that is too focused on competition may not be as fun for users who are more driven by teamwork or personal improvement. For successful gamification, it is necessary to offer different tasks and rewards that are attractive to different types of participants.
- **Lack of long-term interaction** - a gamification system that is not designed for long-term engagement is likely to lose effectiveness over time. For this purpose, it is necessary to introduce cycles of interest and cycles of progression, which are described in detail in the previous subsection (Kapp, 2012). Just as sustainability is a long-term commitment, gamification systems should also be designed for prolonged engagement, ensuring continued eco-friendly actions.
- **Ethical implications** - gamification can have unintended ethical effects, such as reinforcing bad stereotypes and encouraging addiction to rewards and power. These potential implications must be considered by designers, who must then take steps to mitigate them. (Deterding et al., 2011)
- **Relying on individual mechanisms** - while mechanisms such as points, badges and leaderboards can be useful in encouraging users to interact with the system, their overuse of these elements can result in a shallow and unengaging experience. The use of game mechanics must be balanced with other components such as narrative, social interaction and teamwork (Zichermann & Cunningham, 2011). While badges for sustainable actions can be motivational, their over-reliance can overshadow deeper, more meaningful environmental engagement.

3.2 Mistakes during the implementation phase

For start-ups aiming at sustainability, the effective implementation of a gamified system is as crucial as its design. In addition to system design errors, significant errors can also occur during its implementation and use. These errors refer to the implementation phase of the system, starting from the introduction of a gamified system and processes, and ending with activities such as monitoring and control. Errors that appear during system implementation can be:

- **Ignoring feedback** - gamification should be managed by focusing on the user, rather than ignoring their feedback. Ignoring user feedback can result in a gamified system that does not meet user requirements and may even be detrimental to implementation. Feedback from users, especially concerning the sustainability impact of their actions, should never be ignored. Start-ups should ensure that they process and incorporate this feedback to fine-tune the gamified system's ecological objectives. During the implementation phase, designers need to process feedback and collaborate with users to ensure that the gamified system is successful and engaging. (Deterding et al., 2011)
- **Inappropriate rewards** - user rewards should be meaningful and attractive. Insufficient rewards may result in dissatisfaction and lack of interest on the part of participants in the system. To attract different types of users, designers should consider providing different incentives. (Kapp, 2012)
- **Neglecting experiential learning** - gamification can be a useful tool for learning and development, but it should be implemented in order to acquire new knowledge and skills. If participants do not feel that they are progressing professionally, they may stop using the system (Kapp, 2012).
- **Poor integration with existing systems** - to ensure a seamless user experience, gamification needs to seamlessly integrate with existing systems. Inadequate integration can result in technical challenges and frustrate users. (Zichermann & Cunningham, 2011). Start-ups, particularly in the sustainability sector, often employ unique tech solutions. Any gamified system should integrate smoothly with these to avoid technical glitches
- **Failure to address cultural differences** - gamification can be influenced by cultural differences in user expectations and preferences. When building a gamified system, designers need to consider cultural elements to ensure that it is effective and engaging for users from different cultural backgrounds (Sailer et al., 2017)
- **Lack of scalability** - gamification should be created with system scalability in mind, in order to support an expanded user base. Failure to consider scalability can result in technical problems and reduce the effectiveness of the gamified system in the long run (Zichermann & Cunningham, 2011). As the sustainable start-up grows, so should its gamified system. Not considering this scalability can lead to technical and ecological inaccuracies.
- **Little interaction with the system** - users should be involved in the design and implementation of the gamification system to ensure that it meets their needs and preferences. Failure to engage users can result in a system that is not engaging or effective.
- **Selection of inappropriate mechanisms** - effective gamification requires a well-designed mechanism that will encourage participation and interaction in the system. Inadequate mechanisms can lead to low interaction with the system, low levels of participant satisfaction and motivation. Gamification mechanisms should genuinely promote sustainability. Ill-conceived mechanisms might inadvertently promote non-sustainable behaviors.
- **Inadequate training** - Users may not understand how to use a gamification system without proper training. Inadequate training can result in a lack of user engagement and frustration. (Werbach & Hunter, 2012)

- **Lack of transparency** - users should be able to understand how the gamification system works and how their actions are measured and evaluated. A lack of transparency can lead to a lack of trust and user disengagement. (Deterding et al., 2011). Users should clearly see the environmental impact of their actions within the gamified system. Any ambiguity can deter them from participating further
- **Failure to evaluate effectiveness** - gamification should be evaluated to determine its effectiveness and identify areas for improvement. Failure to evaluate the system can result in missed opportunities for optimization and improvement. (Hamari et al., 2014)
- **Not assessing green impact** - A gamified system in a sustainable start-up should periodically evaluate its ecological impact. Neglecting this can mislead the start-up and its users about their environmental contributions

4. CONCLUSION

The concept of gamification has attracted considerable interest in both academic and business domains because to its potential to motivate individuals towards achieving productive and desired outcomes. This research undertook an examination of the intricacies of this captivating methodology, with a specific emphasis on its implementation in organizational settings and the distinct obstacles encountered by start-ups with a sustainability-oriented approach. Through the integration of psychological constructs and the implementation of strategic rewards, gamification possesses the capacity to effectively access and leverage both internal and extrinsic motives. Consequently, this renders gamification a formidable instrument for enterprises and institutions. The comprehensive analysis conducted on the many benefits and obstacles associated with the use of gamification in processes showed the potential of gamification to enhance organizational efficiency, promote effective teamwork, and increase user engagement. Furthermore, the chapter emphasized the ability of gamification to promote pro-environmental habits, which is a crucial undertaking in the context of the global emphasis on ecological sustainability.

The outlined challenges underscored the need of a meticulously planned design phase, placing emphasis on the importance of well-defined objectives, iterative feedback processes, user personalization, and ethical deliberations. The paper sheds light on the unique obstacles that sustainability start-ups encounter, including the need to establish genuine sustainability benefits and accommodate varying cultural understandings of sustainability. This study presents a thorough theoretical framework for businesses, with a specific focus on those that prioritize sustainability, when contemplating the integration of gamification strategies. By providing practical insights, this guidance can assist start-up companies in effectively utilizing the complete potential of gamification, thereby guaranteeing that their initiatives are in line with broader organizational and environmental objectives. In addition, the article assists organizations in avoiding frequent errors, hence increasing the probability of effective application of gamification strategies.

Although this paper offers a comprehensive overview, it is imperative to recognize and address its inherent limitations. The prioritization of sustainability-focused start-ups may result in a limited exploration of gamification's potential applications in other industries. Furthermore, in light of the swift advancements in technology and the utilization of gamification strategies, certain components may want periodic revisions in order to maintain their pertinence. The ongoing evolution and expanding uses of gamification present a plethora of interesting research subjects. Gamification holds significant potential as a valuable instrument for start-up organizations focused on sustainability. Through meticulous design and deliberate execution, this innovation possesses the capacity to fundamentally transform our approach to work, foster collaboration, and make significant contributions towards the sustainability of our world.

LITERATURE

1. Badgeville (2014). Infographic: Why 70% of Business Transformations Fail.
2. Brundiers, K., & Wiek, A. (2013). Do We Teach What We Preach? An International Comparison of Problem-and Project-Based Learning Courses in Sustainability. Sustainability, 5(4), 1725-1746.
3. Deloitte (2015). Global Human Capital Trends 2015: Leading in the New World of Work.
4. Detering, S., Dixon, D., Khaled, R., & Nacke, L. (2011), "From Game Design Elements to Gamefulness: Defining Gamification", MindTrek'11, Tampere, Finland
5. Gartner (2013). Gartner Says by 2014, 80 Percent of Current Gamified Applications Will Fail to Meet Business Objectives Due to Poor Design.
6. GSIA (2021), Global Sustainable Investment Review 2020
7. Hamari, J., Koivisto, J., & Sarsa, H. (2014). Does gamification work? – A literature review of empirical studies on gamification. In Proceedings of the 2014 47th Hawaii International Conference on System Sciences (pp. 3025-3034). IEEE.
8. Huotari, K., & Hamari, J. (2012) "Defining Gamification–A Service Marketing Perspective", Proceedings of the 16th International Academic Mindtrek Conference, pp. 17-22. ACM Press, New York
9. Kapoor S., (2015), The 5 Barriers to Gamification Success in Business, available at https://www.itexchangeweb.com/blog/the-5-barriers-to-gamification-success-in-businesses/ (accessed on 22.08.2023)
10. Kapp, K. M. (2012), "Games, Gamification, and the Quest for Learner Engagement" T+D, 66(6), pp. 64-68.
11. Mora, A., Riera, D., González, C., & Araya, X. (2016). Successful implementation of a gamification methodology in a healthcare education setting. Revista de la Facultad de Ingeniería, 31(2), 71-79.
12. Reeve, J. (2009), "Understanding Motivation and Emotion", John Wiley and Sons, Hoboken
13. Ryan, R., & Deci, L. (2000), "Intrinsic and Extrinsic Motivations: Classic Definitions and New Directions", Contemporary Educational Psychology 25, pp. 54–67
14. Sailer, M., Hense, J. U., Mayr, S. K., & Mandl, H. (2017). How gamification motivates: An experimental study of the effects of specific game design elements on psychological need satisfaction. Computers in Human Behavior, 69, 371-380.
15. Schein, E. H. (2010). Organizational culture and leadership (4th ed.). San Francisco: Jossey-Bass.
16. Steffen, W., Broadgate, W., Deutsch, L., Gaffney, O., & Ludwig, C. (2015). The trajectory of the Anthropocene: The Great Acceleration. The Anthropocene Review, 2(1), 81-98.
17. TalentLMS (2016). The Gamification of Corporate Training: A Guide to Make Learning Fun.
18. Torres-Toukoumidis, A.; León, D.V.; De-Santis, A.; López-López, P.C. (2022), Gamification in Ecology-Oriented Mobile Applications—Typologies and Purposes. Societies, 12, 42. https://doi.org/10.3390/soc12020042
19. Werbach, K., & Hunter, D. (2012). Gamification: How game elements motivate and engage. In The Gamification of Learning and Instruction (pp. 15-30). John Wiley & Sons.
20. Zichemann, G. & Cunningham, Christopher. (2011). Gamification by design: Implementinggame mechanics in web and mobile apps. CA: O'Reilly Media Inc.

Internet sources:
- https://ecologi.com/articles/blog/gamification-the-key-to-sustainability-engagement-and-behaviour-change (accessed on 25.08.2023)
- https://startupgenome.com/report/gser2021 (accessed on 22.08.2023)
- https://hbr.org/2017/10/the-hardest-thing-about-working-in-the-gig-economy-forging-a-cohesive-sense-of-self (accessed on 24.08.2023)
- https://nielseniq.com/global/en/insights/analysis/2018/global-consumers-seek-companies-that-care-about-environmental-issues/ (accessed on 25.08.2023)